March 19, 1940. J. L. BREESE 2,194,135

BURNER FOR LIQUID FUEL

Filed March 14, 1938

Fig. 1.

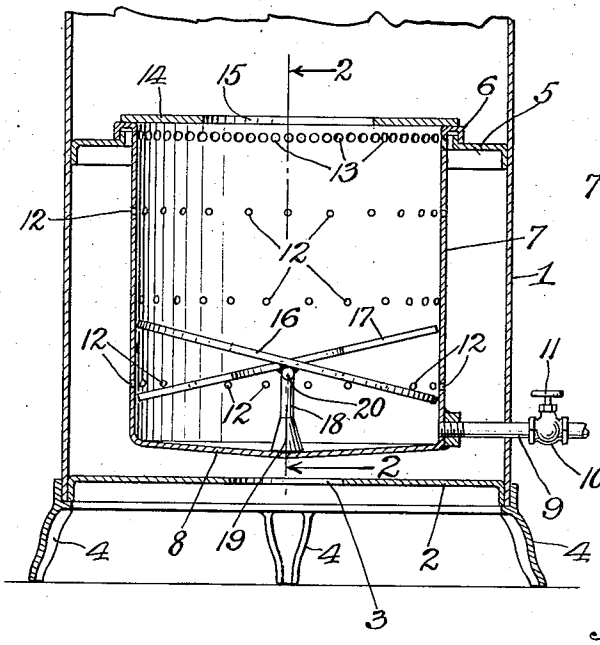


Fig. 2.

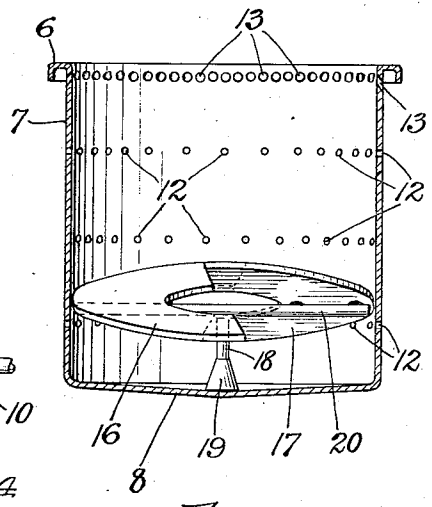


Fig. 3.

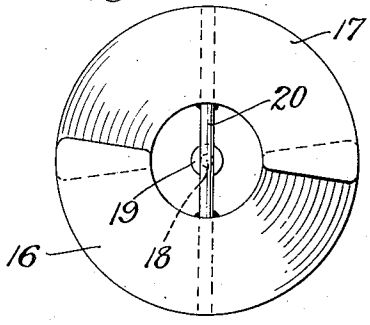


Fig. 4

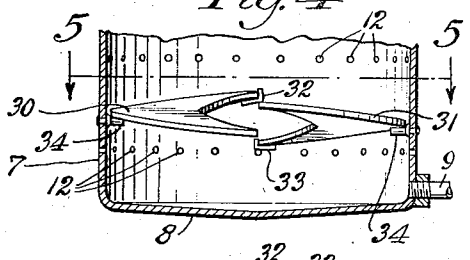
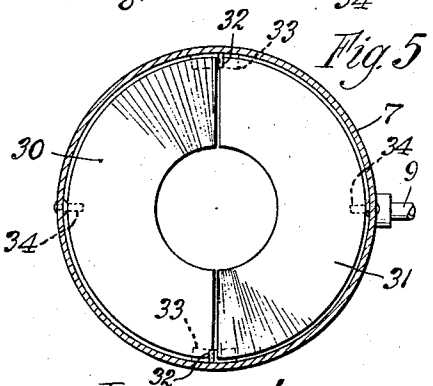


Fig. 5



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UNITED STATES PATENT OFFICE

2,194,135

BURNER FOR LIQUID FUEL

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Application March 14, 1938, Serial No. 195,725

7 Claims. (Cl. 158—91)

My invention relates to an improvement in liquid hydrocarbon burners and has for one purpose the provision of improved means for permitting the maximum turndown or flame variation.

Other purposes will appear from time to time in the course of the specification and claims.

I illustrate my invention more or less diagrammatically in the accompanying drawing wherein:

Figure 1 is a vertical axial section with the baffle plates shown in elevation;

Figure 2 is a section on the line 2—2 of Figure 1 of the fire pot with the baffle plates shown in elevation;

Figure 3 is a plan view of the baffle plates;

Figure 4 is a view of a variant form of the device; and

Figure 5 is a section taken on the line 5—5 of Figure 4.

Like parts are indicated by like symbols throughout the specification and drawing.

Referring to the drawing, 1 generally indicates an outer drum or housing having a bottom 2 with an air aperture 3 and any suitable supporting legs 4. 5 is an intermediate transverse annular flange adapted to receive the downwardly turned channeled edge flange 6 of the fire pot or mixing chamber 7 which has a concave bottom 8 and an inlet member 9 for the liquid hydrocarbon which may be controlled by any suitable valve means herein shown at 10.

Since the details of the valve structure do not of themselves form part of the present invention, a handle valve control member 11 is illustrated. It will be understood that any suitable valve or control means may be employed for controlling the flow of liquid hydrocarbon into the member 7 where it is received by the bottom portion 8.

The wall of the member 7 is provided with a plurality of rows of fairly sparsely arranged primary air inlet apertures generally indicated as 12. Three rows are indicated herein but any suitable number or arrangement may be employed. Secondary air is admitted through the upper row 13 of closely spaced and upwardly and inwardly inclined apertures.

14 is any suitable annular baffle with a central aperture 15 which serves to define and concentrate the flame and also to prevent down drafts of air from the space above the ring 14.

In burners of this type when they are burning at a normal or fairly high rate of combustion, the apertures 12 serve to admit primary air which mixes with the hydrocarbon being vaporized by the heat of combustion and forms an incombustible or partly combustible mixture. This mixture rises up in the pot 7 until it meets the secondary air which flows through the apertures 13. This secondary air renders the mixture fully combustible and at full feed of liquid hydrocarbon the combustion takes place in a flame rising upwardly through the aperture 15 and located primarily above the baffle 14.

In burners of this type it is often desirable, however, to turn the burner down low to get in effect a pilot combustion of little or no effective heating value but for the purpose of maintaining combustion during periods of low use or non-use when the valve structure 11 is turned to admit a minimum of the liquid hydrocarbon to the bottom 8. When the user wishes to increase the flame he has merely to increase the flow of liquid hydrocarbon. This provides a larger body of liquid hydrocarbon in the body 8 which in turn provides a larger volume of vaporized hydrocarbon and moves the zone of combustion up to the top of the pot 7 or primarily above the baffle 14. However, when a minimum of the liquid hydrocarbon is being received on the bottom 8, the upper row of holes 12 act as supplies for secondary air and only the bottom row or part thereof acts as a primary air supply.

In order to prevent down drafts or eddy currents, I find it desirable to provide the baffle plates herein shown. I illustrate for example two arcuate plates 16, 17 oppositely located in the member 7 and oppositely inclined with relation to each other. These may be flat as shown in Figure 1 or may be somewhat spiraled, the specific shape of the plates being a matter of choice. Flat rings are perfectly practical, however, as long as they are arranged in opposition as shown in Figure 1. They may be of a variety of lengths of arc but I find that plates of in the neighborhood of one hundred eighty degrees of arc are satisfactory. It may be worth while under some circumstances to make them of somewhat greater length of arc so that the ends overlap as shown in Figure 3.

Any suitable means may be employed for holding these plates in position. I illustrate for example a central support 18 with a species of bottom enlargement or foot 19. A transverse rod or support 20 may be mounted in the top of the member 18 and the two plates 16 and 17 may be secured to the rod 20 in any suitable fashion.

I illustrate in Figures 4 and 5 a variant form of the device in which I employ two baffles 30,

31 of spiral form. I illustrate them as describing one hundred eighty degrees or arc but it will be understood that the arc may be somewhat greater or somewhat less, and that if desired the spiral baffles may be caused to overlap at the ends as shown in Figure 3. However, the form of Figures 4 and 5 is practical and operative.

If desired, I may employ the form of support shown in Figures 1 to 3, but I illustrate in Figures 4 and 5 supporting projections or pins 32 for the upper corners of the baffles, 33 for the lower corners, and 34 for the intermediate portions. The projections 32 and 33 may be so formed as to limit or position each of the baffle members 30, 31 whereby they are properly located not only in relation to the height of the burner but in relation to the circumference. It will be understood, of course, that the baffles 16, 17 of Figures 1, 2 and 3 may be similarly supported and I therefore wish it to be understood that each of the supporting means herein described may be applied to any of the various forms of baffle herein described.

It will be realized that whereas I have herewith shown and described a practical and operative device, nevertheless many changes might be made in the size, shape, number and disposition of parts without departing from the spirit of the invention. I therefore wish my description and drawing to be taken as in a broad sense illustrative or diagrammatic, rather than as limiting me to my precise showing.

I claim:

1. Combustion apparatus comprising a hydrocarbon burner of the vaporizing pot type, said burner including a mixing chamber having a plurality of air inlet apertures in the wall thereof located in a plurality of vertically spaced horizontal rows, means for admitting a liquid hydrocarbon to the mixing chamber, and baffle means located intermediate the top and bottom of said mixing chamber, said baffle means including a pair of diametrically opposed arcuate plates having an arcuate length of approximately 180 degrees and arranged to form a central aperture between the upper and lower portions of the mixing chamber, each of said plates being arranged so that the plane thereof intersects the plane of the other plate within the confines thereof and intersects at least one of the horizontal rows of air inlet apertures.

2. Combustion apparatus as defined in claim 1 wherein the radially outer edge of each plate conforms generally to and closely approaches the inner face of the mixing chamber wall.

3. Combustion apparatus as defined in claim 1 wherein the lowermost edge of each plate lies in substantially the same horizontal plane as the lowermost edge of the other plate.

4. Combustion apparatus as defined in claim 1 wherein the uppermost edge of each plate is spaced a substantial distance above the lowermost edge of the other plate.

5. Combustion apparatus comprising a hydrocarbon burner of the vaporizing pot type, said burner including a mixing chamber having a plurality of vertically and horizontally spaced air inlet apertures in the wall thereof, means for admitting a liquid hydro-carbon to said mixing chamber, and baffle means being located intermediate the top and the bottom of said mixing chamber and including a pair of diametrically opposed arcuate plates having an arcuate length of approximately 180 degrees arranged to form a central aperture providing communication between the upper and lower portions of the mixing chamber, each of said plates being inclined to the horizontal and arranged so that the plane thereof intersects the plane of the other plate within the confines thereof whereby there are more air inlet aperatures below the upper edge of each plate than there are below the lower edge of each plate.

6. Combustion apparatus as defined in claim 5 wherein the lowermost edge of each plate is positioned near the level of the lowest of the air inlet apertures and the upper edge of each plate is located a substantial distance above the level of the lowest of said apertures.

7. Combustion apparatus as defined in claim 5 wherein the means for admitting liquid hydrocarbon to said mixing chamber includes a fuel inlet opening in the wall of the mixing chamber adjacent the bottom thereof and wherein the lower edge of one of the said plates is arranged above and closely adjacent to said fuel inlet opening.

JAMES L. BREESE.